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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/470,236	11/15/99	BAILEY A	LAM1P123/P05

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IM22/0926

EXAMINER	
ALEJANDRO MULERO,L	
ART UNIT	PAPER NUMBER
1763	5

DATE MAILED: 09/26/00

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trad marks

Office Action Summary	Application N . 09/470,236	Applicant(s) BAILEY ET AL.	
	Examiner Luz L. Alejandro	Art Unit 1763	

-- The MAILING DATE of this communication appears on the cover sheet with th correspondenc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disp sition of Claims

4)☒ Claim(s) 1-37 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-37 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved.

12)☐ The oath or declaration is objected to by the Examiner.

Pri rity under 35 U.S.C. § 119

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

a)☐ All b)☐ Some * c)☐ None of the CERTIFIED copies of the priority documents have been:

1.☐ received.

2.☐ received in Application No. (Series Code / Serial Number) _____ .

3.☐ received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

15) ☒ Notice of References Cited (PTO-892)
16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4 .
18) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
19) ☐ Notice of Informal Patent Application (PTO-152)
20) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Claims 1-2 and 7-11 are rejected under 35 U.S.C. 102(e) as being anticipated by Moslehi et al., U.S. Patent 5,976,261.

Moslehi et al. shows the invention as claimed including a plasma processing chamber used to process a substrate (see Figure 1) and a programmable gas showerhead whereby there are N zones created, each of the N zones being independently programmable to control, for example, flow rates in the upper portion of the processing chamber (see abstract), wherein the programmability can be done during real-time operation (see column 4, line 10 – column 6, line 32).

Claims 1, 3, 7-9, 12-13, and 15-18 are rejected under 35 U.S.C. 102(e) as being anticipated by Li et al., U.S. Patent 6,009,830.

Li et al. shows the invention as claimed including a plasma processing chamber 8 used to process a substrate; and a gas flow controller 76 coupled to the processing chamber and controlling flow of input gas line 40 and input gas line 50 into the

processing chamber, input gas line 50 being located in the top center portion of the substrate and input gas line 40 being located adjacent the substrate in a lower peripheral portion (see Figure 2), the controller controlling the opening of the valves 52, 56, 60, 62, and the mass flow valves 68, 70, 72, 74 based upon the process recipe which is being carried out by the controller (see column 5, lines 4-19). Note in Figure 2 that there are multiple gas inlets and outlets associated with the apparatus.

Claims 1-2, 7-9, and 12-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Hartig et al., U.S. Patent 5,683,548.

Hartig et al. shows the invention as claimed including a plasma processing chamber 16 and a gas flow system 20 coupled to the plasma processing chamber, the gas flow system controlling independent gas feed lines (34, 35, 36, 35, 34) including the gas flow and the gas flow rate (see column 2, lines 25-40).

Claims 1-9 and 12-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Ishii et al., U.S. Patent 5,571,366.

Ishii et al. shows the invention as claimed including a plasma processing chamber 4 including a controller 37 which is used to control the input gas lines which are in the lower portion of the substrate so as to be opened in the chuck region, and in an upper portion of the substrate so as to be dispersed by a showerhead, whereby the controller sends out information based upon information from sensors 36, 38 or a preset

signal to portions of the apparatus including the mass flow controllers 28 (see Figure 6 and column 6, lines 34-62).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 10-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al., U.S. Patent 6,009,830 or Hartig et al., U.S. Patent 5,683,548 or Ishii et al., U.S. Patent 5,571,366.

All of the references are applied as above but lack anticipation of showing a gas ring structure. However, the examiner takes official notice that the use of gas ring

structures are notoriously well known because they are useful in providing uniform dispersion of gas and thus a more uniform plasma.

Claims 19-20, 25-29, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ueda et al., U.S. Patent 5,810,932 in view of Kadomura, U.S. Patent 6,096,160 and further in view of Moslehi et al., U.S. Patent 5,976,261.

Ueda et al. shows the invention substantially as claimed including a chamber 15 which is in the shape of a cylinder in which plasma is generated; a coupling window 11 disposed at an upper end of the chamber; an RF antenna 12 disposed above a plane defined by the substrate; and an electromagnet arrangement 14 proximate the antenna (see Figure 7 and its description).

Ueda et al. fails to show a controller to vary the magnitude of the magnetic field. Kadomura discloses an magnet arrangement 53 whereby a d.c. power supply 68 is coupled to the magnets and is varied in a controlled manner (see abstract) in order to better control the plasma. In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the controlling system of Kadomura in the apparatus of the Ueda et al. reference because such a control system allows for better controllability of the plasma system.

Ueda et al. and Kadomura fail to show the gas supply system as disclosed above. Moslehi et al. shows the gas supply system as disclosed above including a plasma processing chamber used to process a substrate (see Figure 1) and a programmable gas showerhead whereby there are N zones created, each of the N

zones being independently programmable to control, for example, flow rates in the upper portion of the processing chamber (see abstract), wherein the programmability can be done during real-time operation (see column 4, line 10 – column 6, line 32). In view of this disclosure, it would have been obvious to one of ordinary skill in the art to utilize the gas delivery system of Moslehi in the apparatus disclosed by the Ueda et al. and Kadomura references because this will allow for more uniform distribution of the gas throughout the chamber.

Claims 19-20, 25-27, 30-32, and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ueda et al., U.S. Patent 5,810,932, in view of Kadomura, U.S. Patent 6,096,160, and further in view of Hartig et al., U.S. Patent 5,683,548.

Ueda et al. and Kadomura are applied as above but lack anticipation of the gas delivery system as claimed. Hartig et al. shows the gas delivery system as claimed including a plasma processing chamber 16 and a gas flow system 20 coupled to the plasma processing chamber, the gas flow system controlling independent gas feed lines (34,35,36,35,34) including the gas flow and the gas flow rate (see column 2, lines 25-40). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the gas delivery system in Hartig et al. in the apparatus of the Ueda et al. and Kadomura references because this enables more uniform gas distribution in the chamber.

Claims 19-27 and 30-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ueda et al., U.S. Patent 5,810,932, in view of Kadomura, U.S. Patent 6,096,160, and further in view of Ishii et al., U.S. Patent 5,571,366.

Ueda et al. and Kadomura are applied as above but lack anticipation of the gas delivery system as claimed. Ishii et al. shows the gas delivery system as claimed including a plasma processing chamber 4 including a controller 37 which is used to control the input gas lines which are in the lower portion of the substrate so as to be opened in the chuck region and in an upper portion of the substrate so as to be dispersed by a showerhead, whereby the controller sends out information based upon information from sensors 36, 38 or a preset signal to portions of the apparatus including the mass flow controllers 28 (see Figure 6 and column 6, lines 34-62). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the gas delivery system in Ishii et al. in the apparatus of the Ueda et al. and Kadomura references because this will enable better distribution of gas throughout the plasma chamber.

Claims 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ueda et al., U.S. Patent 5,810,932, in view of Kadomura, U.S. Patent 6,096,160, and further in view of Li et al., U.S. Patent 6,009,830 or Hartig et al., U.S. Patent 5,683,548 or Ishii et al., U.S. Patent 5,571,366.

All of the references are applied as above but lack anticipation of showing a gas ring structure. However, the examiner takes official notice that the use of gas ring

structures are notoriously well known because they are useful in providing uniform dispersion of gas and thus a more uniform plasma.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Campbell et al., U.S. Patent 4,990,229, Markunas et al., U.S. Patent 5,018,479, Saito et al., U.S. Patent 5,587,205, Ishii et al., U.S. Patent 5,938,883, and Mosely et al., U.S. Patent 6,071,572 show the state of the art in plasma apparatus configuration.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luz L. Alejandro whose telephone number is 305-4545. The examiner can normally be reached on Monday to Thursday from 8:30 to 6:00 and alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Mills, can be reached on 308-1633. The fax phone numbers for the organization where this application or proceeding is assigned are 305-3599 for regular communications and 305-3599 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 308-0661.

LLAM
September 24, 2000

GREGORY MILLS
PRIMARY EXAMINER